



Federal Air Surgeon's Medical Bulletin

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Aviation Safety Through Aviation Medicine

For FAA Aviation Medical Examiners, Office of Aviation Medicine Personnel, Flight Standards Inspectors, and Other Aviation Professionals.



Civil Aeromedical Institute Instructors Roger Storey (left, standing) and Jim Spanyers (right) conduct altitude chamber training for these FAA Flight Inspection pilots—the first in the new chamber.

New Hypobaric Chambers Now Operational

J.R. Brown

THE CIVIL AEROMEDICAL INSTITUTE is pleased to announce the operational status of its two new hypobaric chambers. These chambers are the most technically advanced in the world and are the only chambers to meet the American Society of Mechanical Engineers' *safety standards for pressure vessels for human occupancy*.

The training chamber (photo, left) can accommodate 20 students and two instructors.

The research chamber has computer-controlled environmental conditioning with a broad temperature and humidity range.

If you are interested knowing more about the training chamber, its capabilities, or to schedule a Physiological Training session, contact:

Airman Education Programs
405-954-4837

An Unconscious Landing

Plane Lands Itself in Hayfield as Pilot Slumbers

Douglas R. Burnett

Pilots love to describe their great landings, some of which are characterized (usually by others) as "unconscious." However, to land while being unconscious, yet able to describe it is an entirely different matter. Ordinarily, a pilot's in-flight incapacitation brings about tragic consequences. —Editor

ON THE AFTERNOON OF MARCH 1, 1999, we were enjoying an exceptionally good Basic AME (aviation medical examiner) seminar. Dr. **Allen Parmet**, presenting aviation physiology (as always, on Monday afternoon), had started to tell the remarkable story of a pilot who lost consciousness while flying alone and woke up in a hay field. Before Dr. Parmet could finish, a voice from the back of the room exclaimed, "I was that pilot!"

Dr. **Robert Frayser**, from Hoisington, Kan., attending his first AME seminar, took over telling this incredible, real-life incident that had happened to him just over a year ago in central Missouri. He had left his home airport at 7 AM enroute for Topeka, Kan. "I was flying alone in my Comanche 400, cruising at 5,500 feet on autopilot, with the sun coming up on a clear, beautiful day." All

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The Federal Air Surgeon's Column

The Vagaries of Budgets

MY SEVERAL YEARS AS A MANAGER of a federally funded program has taught me the necessity of paying close attention to all matters related to budget administration. In essence, it has become clear to me that all programs—productive or non-productive, good or bad—all live or die by the skill of the manager in securing and judiciously expending funds.

I have been blessed with an energetic and knowledgeable staff to assist me in these matters, and I can say without hesitation that the funding successes experienced by the Office of Aviation Medicine have been more a product of the work of my staff than my own personal effectiveness.

There are times, however, when even the most effective manager and staff are unable to secure the optimum resources that would permit program growth and the most desirable productivity.

Over the years I have seen many “ups” and “downs” in the financial posture of the FAA and, in particular, the Office of Aviation Medicine. Among others, I remember quite well those instances when the agency verged on total shutdown, when reduction-in-force notices were prepared for distribution to employees, when certain employees were given financial incentives to vacate their positions so that staffing levels could be painlessly reduced, and when travel and training were canceled to conserve funds (including the conduct of AME seminars). Unfortunately, the FAA, including the Office of Aviation Medicine, again finds itself experiencing financial difficulties.

The fallout for the Office of Aviation Medicine, while not disastrous, is damaging. To meet funding shortfalls, we have curtailed employee travel and training, and hiring of new employees to fill vacated positions has been “frozen.” To accommodate anticipated continuing funding shortfalls, the staffing level for future years has been reduced by seven positions. Further actions will have to be taken if additional reductions are required.

The short-term impact of our funding limitations is being felt throughout the Office of Aviation Medicine, but, with a few exceptions, will not be felt by AMEs. One major exception, however, is in respect to a potential resurgence of extensive delays in the processing of airman medical certification applications at the Aeromedical Certification Division, where we currently have a number of position vacancies that cannot be filled because of the employment “freeze.” By its nature, the processing of medical certification



Jon L. Jordan, MD, JD

applications is heavily personnel-dependent, and even a small reduction in staffing severely compromises our ability to make the system run smoothly.

It is, in part, these ups and downs in funding that lead us to develop systems for program delivery that are less personnel-dependent. Automation of ECG transmission and processing is one, and, of course, implementation of the Airman Medical Certification System (electronic transmission of medical certification examination data) and Document Imaging Workflow Systems (scanning of medical information into a computer data base) are others. The development of the Computer-Based Information module as a substitute for some seminar attendance was another initiative driven not only by a need to relieve a financial burden on AMEs, but also to lessen our dependence on funding.

It is essential that we continue to seek ways to become less dependent upon the vagaries of our budget process and the undulating availability of resources. I am hopeful that all of you will join us in our objective of providing the best possible service to the flying public in the most cost beneficial manner.

Your diligence in the accurate recording and transmission of Form 8500-8 data, solid decision-making, and adapting to full use of the new electronic systems will help significantly.

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Federal Air Surgeon's Medical Bulletin

Secretary of Transportation

Rodney E. Slater

FAA Administrator

Jane F. Garvey

Federal Air Surgeon

Jon L. Jordan, MD, JD

Editor

Michael E. Wayda

The Federal Air Surgeon's Medical Bulletin is published quarterly for Aviation Medical Examiners and others interested in aviation safety and aviation medicine. The Bulletin is prepared by the FAA's Civil Aeromedical Institute, with policy guidance and support from the Office of Aviation Medicine. An Internet on-line version of the Bulletin is available at: <http://www.cami.jccbi.gov>

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MEETINGS CALENDAR
UPCOMING INTERNATIONAL EVENTS
OF INTEREST FOR '99

April 23-30, New Orleans, La.
 Annual American Occupational Health Conference. Sponsored by ACOEM. Info: ACOEM Education Dept., 55 W. Seegers Rd., Arlington Heights, IL 60005; Phone: (847) 228-6859; FAX: 847-228-1856; Web site: www.acoem.org

May 2-7, Columbus, Ohio.
 International Symposium of Aviation Psychology. Info: Richard Jensen, 164 W. 19th Ave., Columbus, OH 43210; Phone: (614) 292-2405; FAX: (614)-292-1014; E-mail: jensen.6@osu.edu

May 10-13, Daytona Beach, Fla.
 Accident Investigation and Management. Info: Embry-Riddle Aeronautical University, Division of Continuing Education, 600 S. Clyde Morris Blvd., Daytona Beach, FL 32114-3900, Web site: www.ec.erau.edu

May 14-18, Daytona Beach, Fla.
 Human Performance in Aviation. Info: Embry-Riddle Aeronautical University, Division of Continuing Education, 600 S. Clyde Morris Blvd., Daytona Beach, FL 32114-3900, Web site: www.ec.erau.edu

May 16-20, Detroit, Mich.
 Annual Scientific Meeting of the Aerospace Medical Association. Info: AsMA, 320 S. Henry St., Alexandria, VA 22314; Phone: (703) 739-2240; FAX: (703)-739-9652; Web site: www.asma.org

June 5-6, Toronto, Ont., Canada.
 International Occupational Health and Safety Performance Management Systems. Info: AIHA, 2700 Prosperity Ave., Suite 250, Fairfax, VA 22031; E-mail: infonet@aiha.org; Web site: www.aiha.org

June 7-10, Prescott, Ariz.
 Accident Investigation and Management. Info: Embry-Riddle Aeronautical University, Division of Continuing Education, 600 S. Clyde Morris Blvd., Daytona Beach, FL 32114-3900, Web site: www.ec.erau.edu

July 11-16, Victoria, BC, Canada.
 Flying Physicians Association Annual Meeting. Info: FPA Headquarters, P.O. Box 677427, Orlando, FL 32867; Phone: (407) 359-1423; FAX: (407) 359-1167; E-mail: 75114.1632@compuserve.com; Web site: www.fpadrs.org

August 22-26, Budapest, Hungary.
 International Congress of Aviation and Space Medicine (ICASM). Info: Dr. Gabor Hardicsay, ICASM, PO Box 41, H-1675, CAA Hungary, Budapest; Phone/FAX: +36-1-280-0030; E-mail: hardi@mail.datanet.hu

AME TRAINING

AVIATION MEDICAL EXAMINER

May 1999 – April 2000

Seminar Schedule

<u>DATES</u>	<u>CITY</u>	<u>CODES</u>
1999		
May 16 - 20 -----	Detroit, Mich. (AsMA) -----	OOE (3)
June 14 - 18 -----	Oklahoma City, Okla. -----	Basic (1)
August 20 -22 -----	Kansas City, Mo. -----	OOE (2)
September 13 - 17 -----	Oklahoma City, Okla. -----	Basic (1)
October 29 - 31 -----	Charleston, S.C. -----	N/NP/P (2)
December 6 - 10 -----	Oklahoma City, Okla. -----	Basic (1)

2000

January 14 - 16 -----	West Palm Beach, Fla. -----	AP/HF (2)
March 20 - 24 -----	Oklahoma City, Okla. -----	Basic (1)
April 28 - 30 -----	Washington, D.C. -----	Cardio (2)

CODES

- (1) A 4½ -day AME seminar focused on preparing physicians to be designated as Aviation Medical Examiners. **Call your Regional Flight Surgeon.**
- (2) A 2½ -day AME seminar consisting of approximately 12 hours of AME-specific subjects plus 8 hours of subjects related to a designated theme. **Registration must be made through the Oklahoma City AME Programs Office: (405) 954-4830.**
- (3) A 3½ - day AME seminar held in conjunction with the Aerospace Medical Association (AsMA). **Registration must be made through AsMA. (703) 739-2240.**

AP/HF	Aviation Physiology/Human Factors Theme Seminar
Cardio	Cardiology Theme Seminar
OOE	Ophthalmology-Otolaryngology-Endocrinology Theme
N/NP/P	Neurology/Neuro-Psychology/Psychiatry Theme Seminar

The Civil Aeromedical Institute is accredited by the Accreditation Council for Continuing Medical Education and the American Academy of Family Physicians to sponsor continuing medical education for physicians.



Aeromedical Certification Update

Aeromedical Certification in 1999 and Beyond

Warren S. Silberman, DO, MPH

PROLOGUE:

HAVING JUST SEEN THE MOVIE, *Shakespeare in Love*, with the wife and girls, I'm in the mood for writing a short play about how we conduct the certification business is going to change. Remember, though, that I'm a doctor, and while my vision of the future may not be poetic, it is realistic, based on a very plausible scenario. After all, I'm using my computer's keyboard, not ink-stained fingers to compose this little ditty.

ACT I, SCENE I. The place: A good physician's antechamber, anywhere in the US. The time: about one year hence.

Enter, AIRMAN APPLICANT, who has arrived for his FAA third-class medical examination. NURSE RATCHET, who has toiled for the kindly doctor for these many years, presents AIRMAN APPLICANT with the new and improved, FAA Form 8500-8*, along with a suitable writing instrument. AIRMAN APPLICANT completes the front side of the form, and with a flourish, signs block 20. NURSE RATCHET escorts him to the clinic room that has been designated for flight examinations.

ACT I, SCENE II. The laboratory, a chamber where physical examinations are conducted.

NURSE RATCHET, acting the part of the stern, yet compassionate inquisitor, uses the tools of her trade to observe and record her patient's hidden signs: how beats the heart within him, how mightily does the blood course through his veins... now she whispers to him of chocolate donuts and other meaningless gibberish to see if he can comprehend the low decibels she has uttered in the still chamber. Finally, she directs his rapt gaze to a graphic that is inscribed with tiny little lines designed to see if the vision is sharp or in need of focal

augmentation. She records the results of these preliminary tests and exits the chamber to another nearby chamber, where she will examine the contents of a container with a yellowish fluid that was provided earlier by AIRMAN APPLICANT as a prerequisite to any further proceedings.

ENTER, the GOOD PHYSICIAN. GP is a warm, friendly person, very busy but prone to uttering small talk about the weather, airplanes, golf, the FAA. GP greets AIRMAN APPLICANT with a smile and a handshake. Surveying the form the nurse provided, he bolts to his office computer and summons the Internet, using Fast Flight Service.com, the service that was purchased for a pittance, a mere \$14.95 per month.

Using the username and password provided by the Aeromedical Certification Division (AMCD) in Oklahoma City, GP uses the newest version of the Aeromedical Certification System (AMCS) to locate AIRMAN APPLICANT's medical files. As if by magic, his historical data illuminates the screen with facts, information about how he fared on his last medical examination, the exam before that, and as far back as to when AIRMAN APPLICANT first began to ply the skies as a fledgling aviator.

GP invites AIRMAN APPLICANT to view the computer images, and they discuss the information it provides them. GP then presses the ENTER button and the historical data is now transported to the AMCD files. Inviting AIRMAN APPLICANT now to occupy a tiny table, GP examines him to determine if his body is prepared to withstand the rigors of unrestricted flight. Once satisfied that it will, GP scribbles out his findings on the back portion of the 8500-8, signs the form,

and hands it to NURSE RATCHET, who replaces the busy doctor at the computer console to enter the new examination data. One last look to be sure all is correct, and she submits the file to the AMCD.

ACT I, SCENE III. The Antechamber.

NURSE RATCHET finishes using the office printer to produce a new medical certificate. GP signs the document and presents it to AIRMAN APPLICANT with a restriction noted that "Holder Must Wear Corrective Lenses." AA is also presented with the third page of the 8500-8, which is his copy of the front side of the 8500-8, for him to have and to hold until the next visit.

AIRMAN APPLICANT exits the antechamber, proclaiming to one and all that, for another two years, he is a happy man.

CURTAIN

EPILOGUE:

Well, you get the idea. This is our vision of the future with the new Internet-based AMCS. To take this scenario a step further, let's say the airman was being followed for mild hypertension. This will give you a view from within the Aeromedical Certification Division and is a representation of how we will handle the workflow. The data GP just submitted has been received, instantaneously matched, but causes the system to produce a REJECT MESSAGE.

A clerk receives a list of rejected applications, with AIRMAN APPLICANT's name listed, retrieves his case from the files with a PI number, and determines that he has been followed for mild essential hypertension. The file, along with the other files that came in that day with PI numbers, is sent to the scanning area to be indexed and scanned into the new electronic medical file that was developed on this

*(scheduled to be distributed in September 1999)

Continued...

airman. The case is then reviewed for quality control and placed into AMCD's new Document Imaging and Workflow System, which is also part of the new way that business is being conducted.

The case is then sent to a Legal Instrument Examiner's workflow box, an instantaneous workflow layout that she is able to access on her work station computer.

The reviewer clicks on the icon with the airman's MID number and reviews the hypertension follow-up report that GP had inserted into block 60 of the 8500-8. The report sent in by GP was quite favorable, so the reviewer clicks on the drop-down box with a list of all the letters that AMCD uses and brings up an Eligibility letter shell, inserts the blood pressure blurb, presses Print, and the Eligibility letter gets printed. The letter is reviewed, signed, and sent out — all within 24 hours of the examination.

At the end of your busy workweek, you package up the 50 FAA examination forms that you completed, and mail them to the AMCD where they are permanently stored. The Federal Air Surgeon has determined that the AMCD will be the repository for the original 8500-8's.

Fellow aviation medical examiners, this is going to be *reality* in a few months! Dr. Jordan, through your Regional Flight Surgeons, has requested that all aviation medical examiners use the above system exclusively by October 1, 1999.

The sequence of events you read above will already be a reality for many aviation medical examiners by the time you read this. From March of 1999, until October 1, 1999, we will be testing the system in "real-time" with volunteers participating in the final systems check of the Aeromedical Certification System.



Dr. Silberman manages the Civil Aeromedical Institute's Aeromedical Certification Division.

Notice to All AMEs: AMCS Internet Access Mandatory October 1 Aeromedical Certification Division Staff Report

Because of "Year 2000" compliance issues, we will have a new Aeromedical Certification System (AMCS) Internet software program in place by October 1, 1999. Aviation medical examiners (AMEs) who are currently using the DOS-based Version 9.5 of AMCS to transmit FAA Form 8500-8 medical examination data to the Federal Aviation Administration will no longer be able to use it on that date. Instead, you will use your computer and modem to access the Internet to electronically submit examination data to the AMCS. Additional information will be provided in the summer issue of the *Bulletin*.

To describe how the new system will work, we have compiled 19 typical questions about the new way of doing business.

1. How do I become an AMCS Internet v1.0 user?

You will be notified and sent an instruction package with the Web site address and log-on information when the AMCS Internet v1.0 is ready to go on-line.

2. What are my responsibilities as an AMCS Internet user?

An AME who participates in the AMCS program will be responsible for entering and transmitting all FAA Form 8500-8 application data using AMCS Internet v1.0. Once you have entered the data using the AMCS Internet v1.0, you will then mail the original copy to the Aeromedical Certification Division in Oklahoma City.

3. How long does it take to enter FAA Form 8500-8 application data into the AMCS?

Once the initial learning curve has been passed, we estimate that a reasonably proficient individual can enter an average application in five to seven minutes. Individuals with previous PC and Internet experience will generally find the AMCS Internet v1.0 to be a very easy application to learn. Individuals with no computer and Internet experience will generally require a slightly longer time to become proficient. Please note that the five- to seven-minute estimate is partially offset by the amount of time that was previously spent in typing the back of the form. The AMCS Internet v1.0 will be able to copy previous application history for print outs. This, combined with a faster processor and Internet connection, will significantly reduce data entry time.

4. What does the new AMCS do for me?

- Assists you in eliminating accidental, missing, or out-of-range data on the FAA Form 8500-8
- Warns you of data that do not meet certification standards
- Allows you to exercise your best judgment to take proper certification actions.

5. Do I have to enter the data while the applicant is in the office?

No. But you must enter and validate the application before issuing the certificate to the applicant. The application will be automatically transmitted during validation. If you do not enter the application data while the applicant is in the office, we recommend that you either have the applicant return to pick up the certificate, or mail it to the applicant.

6. What computer hardware/software do I need?

The AMCS Internet v1.0 system requirements will support most computer operating systems and platforms. However, whatever computer system you use must be able to support:

- An Internet Protocol (IP) dial-up or local area network connection
- An Internet Service Provider (ISP) to provide the IP dial-up or network connection
- The latest versions of World Wide Web browsers Microsoft Internet Explorer® or Netscape Navigator®

Continued...

When considering a new computer system or upgrade, we recommend that, for maximum performance, you also consider the latest computer industry standards and models.

7. How much does the AMCS Internet v1.0 software cost?

There is no software for you to install on your computer. The only cost will be for your Internet service provider connection.

8. Will the AMCS Internet v1.0 work on my Macintosh?

AMCS is designed as an Internet resource, so you will be required to run the latest Macintosh version of either Microsoft Internet Explorer® or Netscape Navigator®.

9. When will the AMCS Internet program start?

It will become operational and on-line some time before October 1999. The program is currently under development.

10. Whom do I call for help?

When the AMCS Internet version goes on-line, then you will be able to call the AMCS Hotline during normal business hours and they will answer your questions.

11. Do I send my applications to the Region if I'm either a new AME or a new senior AME?

New AME policies vary from Region to Region. Please contact your Regional Flight Surgeon for more information. However, all applications are to be entered via the AMCS Internet v1.0.

12. Do I have to transmit all of my applications using the AMCS Internet v1.0? What if they contain extensive lab reports?

All applications, including deferrals, should be entered using the AMCS Internet v1.0. Attachments may be mailed with the original form with the signature and a cover letter on your office letterhead identifying the airman by name, social security number, and application date. Any additional comments about the applicant may be entered in Item 60.

13. What sort of documentation is available?

AMCS Internet v1.0 is still in development and we will begin testing it soon. We will send documentation availability announcements to you when available.

14. What sort of training is available?

Training announcements will be sent out when the software program has been validated and is ready for use by AMEs.

15. What time of day can I connect?

You can connect to the Internet 24 hours a day, seven days a week. If you have trouble connecting, contact your local ISP. If you have trouble using AMCS Internet v1.0, you will be able to contact the AMCS Internet Hotline during regular business hours, and they will investigate the problem.

16. Do I need a special phone line?

Although a special phone line is not necessary, you may find it convenient.

17. What speed modem should I use?

Whatever modem and speed is compatible with your ISP. A fast modem will allow a fast Internet connection.

18. May I have the applicant enter the information from the front of the FAA Form 8500-8 directly into the AMCS Internet version?

No. The applicant should not enter the data from the front of the form into the Aeromedical Certification System because he or she could conceivably view data on your other aviation medical applicants.

19. Can I use this software for military and Air Traffic Control (ATC) applications?

No. There currently are no plans to use the AMCS Internet program for entering ATC or military applications.

Letters to the Editor

Surgical sculpting of cornea to avoid wearing glasses

Dear Editor:

The Winter '98 *Federal Air Surgeon's Medical Bulletin* ... contained an excellent article [LASIK Refractive Surgery, page 10] on Laser refractive eye surgery using Laser ablation and LASIK techniques.

The authors [Nakagawara, Wood, & Montgomery] point out the "disadvantages" of corneal modification by either of these techniques. Vision is never improved when image-forming light rays are scattered ("glare") while passing through any optical media (dirty or scratched windshields, eyeglass or contact lenses, or the optical media of the eye) on their way to forming a retinal image.

We can readily clean windshields and eyeglass lenses or insert a "good" contact lens. A scatter-inducing cataractic lens can be removed and replaced with an intraocular lens. These procedures improve vision by reducing scatter. If, for cosmetic reasons, (usually myopic) persons, *not pilots*, wish to undergo corneal sculpting (with its now-known post-surgical increased glare), that is their prerogative.

Pilots are another category. Since corneal sculpting is cosmetic and not "vision saving," **it seems to me that the vision improvement due to corneal surgical correction of myopic refractive error is offset by vision "dis-improvement" due to increased glare.** We take here the best post-surgical results, putting aside any complications.

Glasses or contact lenses do not automatically introduce glare. They work for anyone, pilot or not.

As interested and informed aeromedical people, **we should be favoring standards for aeromedical certification of pilots which enhance safety.** Corneal sculpting does not.
Edwin Gordy, MD,
Newtonville, Mass.

Continued...



The authors respond:

We appreciate Dr. Gordy's excellent comments concerning the applicability of refractive surgery for aviators. Complications or undesirable side effects, including increased glare, can result from any invasive refractive procedure. However, an extensive literature review of LASIK indicates that few patients experience significant glare disability, and approximately 0.01% of patients have long-term post-operative corneal haze. Additionally, a review of aviation accident/incident databases from 1980-97 found no operational errors associated with refractive surgery, while traditional forms of refractive correction (spectacles and contact lenses) were identified as contributory factors in several events. This suggests that, for some aviators, the benefits of refractive surgery may outweigh the potential liabilities.

Current FAA policy allows airmen with refractive surgery to obtain a medical certificate. From 1994-96, we estimate that 3,761 civilian aviators had refractive surgical procedures, including 133 who were crewmembers for air carriers. Considering the recent growth in popularity of laser procedures, the number of active civilian pilots with refractive surgery is likely to continue to increase. The purpose of our article was to present current clinical information on LASIK refractive surgery in an objective manner. We strongly recommend that pilots carefully consider both the potential advantages and disadvantages before proceeding with any refractive surgery procedure.

Okay to copy articles from Bulletin?

Dear Editor:

I am an aviation medical examiner and would like to write articles for our local airport newsletter on medical tips for pilots. Is it ok to copy information from the *Federal Air Surgeon's Medical Bulletin* for this newsletter?

Jeff Summe, DO, Monroe, Wash.
Dr. Summe, you are welcome to reprint articles from the *Bulletin*. Please give the author(s) and the *Bulletin* a mention as being the source of the information, e.g., "This article was written by Dr. J.Q. Jones and is reprinted courtesy of the *Federal Air Surgeon's Medical Bulletin*."

If you have access to the Internet, you can simply copy and paste articles of your choice from the pages of the *Bulletin*. Our Web address: <<http://www.cami.jccbi.gov>>

—Editor

Reducing Post Aviation Accident Trauma

Dennis Canfield, PhD, and Ronald Hansrote, MD

THE SUDDEN, UNEXPECTED LOSS OF a loved one in an aviation accident is a traumatic event. This trauma can be exacerbated by the additional burdens of an accident investigation. Family and friends frequently have to wait months for the positive identification of loved ones.

In numerous cases, the loved one cannot be identified using standard identification techniques—fingerprints, dental records, identifying marks, medical history, or personal belongings. Often, individuals can only be identified through DNA analysis—if reference samples are available.

In several recent accidents (Pennsylvania, New York, Indiana, and Florida), some individuals could only be identified by the use of DNA analysis and many individuals were never identified.

The Florida Everglades Valujet and TWA Flight-800 accidents led Congress to pass the Title VII Assistance Act, cited as the "Aviation Disaster Family Assistance Act of 1996." Section 702, "Family Assistance," is administered by the National Transportation Safety Board. This act addresses the needs of the families of air carrier aircraft accidents. All air carriers are tasked with developing a post-accident protocol and training a family assistance team. Total respect and sympathy for both the family and victims' remains are to be adhered to at all times.

To identify individuals by DNA analysis, one must have a reference DNA sample to compare with remains found at the scene of the accident. This reference sample could be DNA collected from the individual prior to an accident, small fragments of tissue with identifying characteristics found at the scene of the accident, or DNA specimens collected from immediate family members such as biological mother,

father, siblings, and children. All of these methods for collecting reference samples have been used in aviation accidents for DNA identification of victims. However, collecting reference samples from family members after a fatal accident is difficult because family members must be contacted and asked for reference samples during a peak period of grieving over the loss of their relative. This request may not seem like an excessive burden, but we must remember that people do not like their personal privacy invaded, especially at a time like this. In some recent aviation accidents, family members did not want to provide samples for testing, and, consequently, the victims could not be identified using DNA analysis.

For a small fee, commercial DNA storage is now available for individuals to "bank" their DNA for later use in personal identification. Certified laboratories (e.g., GeneLink) can store DNA samples for up to 20 years. DNA sample collection kits are available, are simple to use, are non-invasive, and the DNA can be collected without medical assistance. Insurance companies will sometimes pay for storing DNA samples. Collecting and storing DNA reference samples was initiated by the United States Armed Forces several years ago.

Advantages of having a DNA reference sample available:

- rapid, positive personal identification of accident victim
- early identification assists family members and friends in recovering from the death of a loved one
- accident investigators would not have to disturb grieving family members by asking for reference samples
- helps federal agencies comply with the Family Assistance Act.



Dr. Canfield manages the Civil Aeromedical Institute's Toxicology and Accident Research Laboratory. Dr. Hansrote manages the Institute's Occupational Health Division.

Thick Hearted

Idiopathic hypertrophic subaortic stenosis is known to place individuals at increased risk of sudden cardiac death.

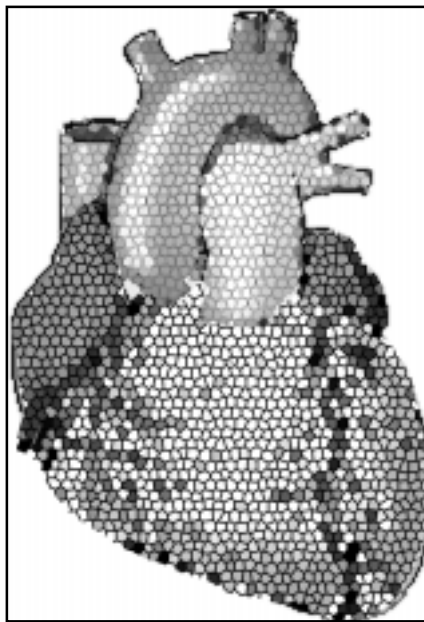
Case Study, by Kevin McKee, DO

A 45-YEAR-OLD DC-9 CAPTAIN presented to his aviation medical examiner (AME) for a routine first-class physical. The airman had no complaints at the time of presentation. The AME detected a heart murmur during his physical examination that had never been reported. The AME then requested a cardiac evaluation.

During the cardiology consult, the airman denied fatigue, shortness of breath, chest pain, dizziness, or syncope. He denied taking any medications and revealed no other significant past medical history. He had a moderate history of smoking and alcohol: less than two packs of cigarettes per month and one or two beers, twice a month. His family history was essentially negative for cardiac disease; however, no one in his family had been worked up for hypertrophic cardiomyopathy.

Physical findings

Physical exam: height 72 inches, weight 190 pounds, blood pressure 130/70. Carotid pulses were normal. Lungs were clear to auscultation. The heart examination revealed normal 1st and 2nd heart sounds with a grade 3/6 harsh, systolic ejection murmur heard along the left sternal border. With the Valsalva maneuver the intensity of the murmur increased one grade and gradually decreased after release of the maneuver. A resting ECG showed left ventricular hypertrophy, mild left atrial enlargement, and a Q-wave in lead III. The echocardiogram demonstrated septal hypertrophy with systolic anterior motion of the anterior leaflet of the mitral valve and a peak gradient across the aortic valve of 3.3 m/sec consistent



with outflow obstruction. The final diagnosis was idiopathic hypertrophic subaortic stenosis.

A further intensive workup revealed no significant arrhythmias, 347 premature ventricular contractions (PVCs), and 2 couplets after a 48-hour Holter monitor, a normal thallium stress test, and a normal dobutamine stress echo. His lipid profile was also normal.

Discussion

Idiopathic hypertrophic subaortic stenosis (IHSS), also commonly referred to as hypertrophic cardiomyopathy, is one of the specific entities known to place individuals at increased risk of sudden cardiac death. IHSS is a genetic cardiac disorder with an autosomal pattern of inheritance (1). The cardinal features of IHSS are marked asymmetrical left ventricular hypertrophy, with

frequent asymmetrical involvement of the septum, supranormal contractility and decreased left ventricular systolic cavity dimension.

The mitral valve also typically moves anteriorly during systole (SAM). Often, IHSS is described as being obstructive or nonobstructive. This refers to whether a pressure gradient is generated that impedes left ventricular outflow. Most patients with IHSS do not have outflow obstruction. Pathologically, the myocytes in IHSS are in disarray and show a characteristic whorled pattern. The ventricular walls can exceed three times their normal thickness, markedly reducing the ventricular cavity. These pathologic features result in impaired ventricular filling at rapid heart rates, which may limit cardiac reserve and exercise performance.

Most patients with IHSS present between the ages of 20 and 40; however, some occasionally present after age 50 (1). Patients may be symptomatic with dyspnea on exertion, chest pain, palpitations, and/or syncope. On the other hand, they may also be asymptomatic at presentation. An outflow murmur may be auscultated at the left lower sternal border. The murmur is typically harsh and increases in intensity with maneuvers that decrease ventricular size, such as the Valsalva or standing after squatting. ECG patterns, such as left ventricular hypertrophy and low voltage in the limb leads, are common. Other possible ECG patterns include bundle branch block, prominent septal Q-waves in the lateral leads, and giant inverted T-waves in the precordial leads (2). Definitive diagnosis is made by echocardiography, and Doppler studies can identify the resting gradients (1).

The task of risk stratification in patients with IHSS has been a difficult one. Young age, syncope, a malignant family history, myocardial ischemia, and sustained ventricular tachycardia are considered as risk factors for sudden cardiac death (3).

Dr. Kevin McKee is a Resident in Aerospace Medicine at Wright State University. He was on a clinical rotation at the Civil Aeromedical Institute when he wrote this article.

Continued...

Several arrhythmias, including PVCs and couplets, have been reported as being potential causes of sudden cardiac death, of which ventricular tachyarrhythmias seem to be the most important. Supraventricular tachycardia and atrial fibrillations are found in about 40% of adults with IHSS but are not associated with increased risk of dying.

The annual mortality rate for IHSS ranges from 3 to 5 %. In children, the annual mortality rate is significantly higher at 6%. However, ventricular tachycardia is only rarely found in children and thus cannot be used to identify those at risk of sudden cardiac death. Some believe that risk identification using electrical instability is less reliable, and attention should be directed toward exercise-induced hypotension, a newly discovered marker of mortality in those with IHSS (4). The mechanism seems to be an abnormality in vascular tone. Despite all the studies that have been done to accurately identify individuals at risk of sudden cardiac death, the phenotypic evidence seems to have come up short.

IHSS is not a single disease entity, but rather represents a group of diseases. The spectrum of IHSS ranges from a subclinical form to a very lethal form. Future investigations to identify those at high risk are being directed at genetic testing. Six genetic mutations have been identified so far (5). Some mutations appear to be more benign than others.

Treatment

Treatment of IHSS is aimed at reducing the contractility of the myocardium and suppressing life-threatening arrhythmias. Beta-blockers have been used for many years to treat symptomatic IHSS (3). Verapamil has become the drug of choice for symptomatic IHSS because of its beneficial effects on systolic and diastolic left ventricular function. Beta-blockers and calcium-channel blockers do not suppress ventricular arrhythmias. Therefore, individuals susceptible to ventricular arrhythmias

are placed on antiarrhythmics. Intracardiac defibrillators are also being used for those at significant risk of dangerous arrhythmias, but no long-term data are available on their effect.

Disposition

The cardiology panel at the FAA Aeromedical Certification Division thoroughly reviewed this airman's case for consideration of a special issuance first-class medical certificate. After reviewing the history and all pertinent cardiac evaluations performed on the airman, they determined that IHSS puts this airman in a high-risk category for sudden incapacitation. In addition, they stated that it is impossible to predict whether any given individual is susceptible to sudden cardiac death. Therefore, the panel recommended denial of this applicant for a special issuance of any class.

Although not specifically stated in the *Guide for Aviation Medical Examiners* as being a noncertifiable condition, those individuals with IHSS are generally not issued a medical certificate. Information provided to the Office of Aviation Medicine by expert cardiologists indicates that those with IHSS have an increased risk of sudden cardiac death and incapacitation well beyond that of the general population.

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A Computer Program for Calculating Flight Radiation Dose

Wallace Friedberg, PhD

AIRCRAFT CREWS ARE EXPOSED TO ionizing radiation, principally from galactic cosmic radiation. To promote radiation safety in civil aviation, the Federal Aviation Administration (FAA) has provided instructional material on radiation exposure during air travel ^(1, 2, 3, 4) based on research performed at the Civil Aeromedical Institute (CAMI).

FAA Advisory Circular 120-61 ⁽⁴⁾ contains recommended topics for a training program on in-flight radiation exposure to instruct air carrier crewmembers and their managers on the possible health risks from exposure to ionizing radiation and on basic radiation protection principles.

The FAA recently released a computer program developed at CAMI called CARI-5E*. The program estimates the galactic radiation dose received on an aircraft flying a great circle route between any two airports in the world. In calculating flight dose, CARI-5E takes into account the location of the aircraft during the entire flight from takeoff to touchdown, including enroute altitudes; time spent at each enroute altitude, and latitude and longitude changes. Based on the date entered by the user, the appropriate databases are accessed for (a) the approximate 11-year cycle of rise and decline in radiation level in the atmosphere associated with changes in solar activity and (b) the characteristics of the earth's magnetic field that influence the galactic radiation entering the atmosphere at the time of the flight.

The program is available from the Radiobiology Research Team's home page found at the CAMI Website: <www.cami.jccbi.gov/AAM-600/610/600Radio.html>

**Editor's note: The CARI-5E program was developed under Dr. Friedberg's leadership.*

See 'Dose' page 11...

Is the Public Being Duped by 'Alternatives?'

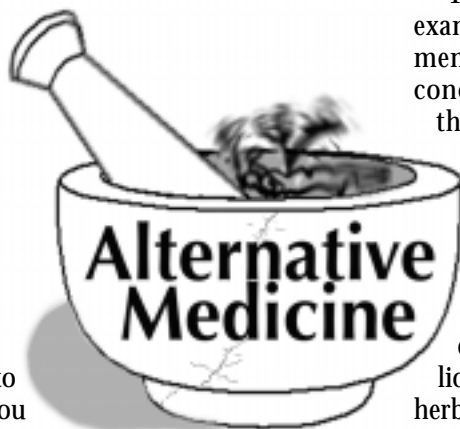
'There is a lot of quackery in this business...'

Commentary, by Stephen H. Goodman, MD

THE HISTORY OF AMERICAN MEDICINE IS REplete with the stories of unprofessional remedies and unscientific methods utilized to treat medical maladies. As we push forward into the twenty-first century,

it is unnerving that folklore and unproven treatments are once again finding their way into mainstream medicine. There is a lot of quackery in this business of alternative medicine, not to mention the enormous business that has surfaced as a result of this burgeoning industry. Depending on whom you want to believe and what journals you read, this industry generates between 9 and 130 billion dollars a year in gross revenues. This bricolage of traditional medical care lacks factual and objective study. The fundamental question that must be addressed regarding this phenomenon is "Why is it so popular in the United States?"

Of course, there is no simple answer; however, several plausible explanations come to mind. The first is that the use of alternative medicine is resurging because traditional medicine has become less accessible and more costly. In addition, this 'herbal renaissance' may be a carry-over from the last two decades in the United States, and those that ascribed to its utility fit very nicely into this "do-it-



yourself" society. The Internet plays into this as well by allowing a giant shopping mall of these products to exist with eye-catching Web sites. This truly is the epitome of virtual medicine being practiced in cyberspace. More profoundly, as the fabric of American culture changes with more people coming in from other countries to live in the United States, they bring with them their own orientation toward medical care and treatments that rely upon herbal remedies.

These new medical therapies that are advertised in the media of the United States were once considered medical fraud. They now are being seriously considered as new accepted modalities.

Herbal Medication and Flying

When having an alternate is not a good thing.

Commentary, by Donato J. Borrillo, MD

IN AVIATION, IT IS USUALLY GOOD PRACTICE for a pilot to have an alternate, such as an alternate airfield, routing, or aircraft. The use of so-called alternative remedies may not, however, be similarly "a good thing."

The aviation medical examiner (AME) should remember, "it is the medical condition, not necessarily the treatment (herbal or otherwise), that may influence the safety of flight."

The Food and Drug Administration (FDA) has little or no authority over the estimated 15 million Americans that take herbal medication, nor does the AME.

The AME should simply regard all purported benefits of an herbal medication as being "true" and disqualify based on the underlying disease or side effects. The AME should not debate the "medical legitimacy" of an herbal medication but should consider the possible underlying disease.

Addressing the disease, not the treatment modality, fosters a more informative relationship with the applicant airman.

First, there are herbal medications that treat a specific underlying condition. These include ginseng, saw palmetto, ginko, St. John's Wort, and echinacea. Asian ginseng (*Panax Ginseng*) is used to increase stamina. The AME should inquire,

"Why is the pilot tired?" A flier that is tired may have a chronic illness or depression. In addition, Ginseng should be avoided by hypertensives and can cause anxiety, irritability, nervousness, and insomnia.

Saw palmetto (*Serenoa Repens*) is a berry product used to treat benign prostatic hyperplasia; its use should spark queries about urinary tract problems.

Ginko biloba is an antioxidant, used to increase blood circulation and oxygenation. It is commonly used to improve memory; however, it may also be used to treat the disqualifying conditions of tinnitus, asthma, and depression. Furthermore, ginko has a profound effect upon platelet function and should not be used with blood thinners.

St. John's Wort (*Hypericum Perforate*) promotes a healthy mood and helps to relieve mild to moderate depression. Both of these conditions require an evaluation prior to medical certificate issuance. Similarly, echinacea (*Echinacea Purpurea*) stimulates the immune system to fight colds and flu; a pilot should not be flying with these symptoms.

See 'Public' next page...

See 'Herbal' next page...

The opinions expressed in these commentaries do not necessarily reflect the official position of the Federal Aviation Administration or the Office of Aviation Medicine.

PUBLIC (from page 10)

What is curious is that most of these therapies are not supported nor have they been proven by the rigors of science to be efficacious.

Currently, there is a study underway at Duke University Medical Center addressing Saint John's Wort (*Hypericum*) in a double blind trial with Zoloft (Sertraline) and placebo. But as yet the results of this study are still pending.

The German medical community, which has had the most experience with these remedies, suggests that they are effective. However, there are some variations with the definitions of medical conditions and the length of treatment required to manage the maladies when these agents are used. So what is really going on here is Americans are self-medicating and

adopting "natural" treatments that make them feel they are in control of their illnesses. One such illustration validates this concept.

The American Cancer Society (ACS) has approved nontraditional therapies as adjunct treatments for individuals carrying certain diagnoses. The ACS views these treatments as "complementary medicine" and endorses their utilization. Additionally, the National Institutes of Health (NIH) has accepted alternative medicine as a legitimate form of therapy and has given credence to this entire concept of treatment. It was Congress that compelled the NIH to create the Office of Alternative Medicine.

So what does this mean to those of us who are in the practice of Aerospace Medicine?

In Aerospace Medicine, there is the "mantra" that safe to fly means there is no forgiving, or excuses, or room for medicinal experimentation with one's mental status, or justification for the use of herbal teas to cure digestive disease. The use of unproven remedies threatens the safety of any mission if the substances being used are untested or effects are unknown.

As practitioners entering the new millenium, we must be wary of these "cures" and be ever so cautious to inquire about recent and remote use of these substances when examining our patient population. To do otherwise is to not only court danger, but also passively buy into treatments that could have untoward and deadly consequences.



Dr. Goodman is the FAA Regional Flight Surgeon, Western Pacific Region, Los Angeles, Calif.

HERBAL (from page 10)

Second, the AME should be aware of herbal medications that prevent illness. These include cranberry, goldenseal, and garlic. Cranberry (*Vaccinium Macrocarpon*) is marketed to prevent urinary tract infections and should not be considered disqualifying; however, one caveat: Is the use of cranberry to prevent kidney stones (which may be disqualifying)? Similarly,

goldenseal (*Hydrastis Canadensis*) is marketed as an antiseptic for the bowel. As a preventive measure, it is not disqualifying; however, if used for acute gastroenteritis, it may be disqualifying. Garlic cloves (*Allium Sativum*) have been used to lower cholesterol and should alert the AME to possible cardiac disease.

In sum, the AME should be ever vigilant for the

airman using alternative medicinal therapies, whether folk, herbal, diet, homeopathy, faith, new age, chiropractic, acupuncture, naturopathy, massage, or music therapy. The AME can make up for the lack of FDA authority, and once again make an alternative "a good thing," by simply considering the underlying disease.



Dr. Donato Borrillo is a flight surgeon with the US Air Force's 48th Aerospace Medicine Squadron at Lakenheath Royal Air Force Base, England. He is also an AME and is Board certified in aerospace medicine.

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Office of Aviation Medicine News

AME Retires After 50 Years

David P. Millett, MD

R.P. Tucker, MD, retired from his East Point, Ga., medical practice last October and ended a 50-year career of service as an aviation medical examiner. His office was located just minutes away from the Atlanta Hartsfield International Airport. The Federal Aviation Administration's Southern Region Medical Division recognized Dr. Tucker in 1997 for his many years of service.

Dr. Tucker was born in 1914 in Charleston, S.C. He graduated from Harvard Medical School in 1938, spent four years in post-graduate internship and residency at Massachusetts General Hospital and Boston Women's Hospital. He then served as a flight surgeon for Pan-Am in Africa, South America, and the Middle East, followed by two years as a US Naval Reserve Officer.

He relocated to East Point and became an aviation medical examiner in 1948. As the years went by, Dr. Tucker devoted increasing amounts of time to aviation medicine until, in his later years, he spent most of his practice in aviation medicine. He especially served the commercial aviation segment by performing more than 1,000 first-class examinations annually.

Our congratulations, and thanks, go to Dr. R.P. Tucker for his many years of devoted service to the aviation community. We will miss him.

His aviation medicine practice will continue to serve the aviation public under the leadership of long-time aviation medical examiner **Dr. Stacey Vereen**.

Dr. David Millett manages the Southern Region's Medical Division.

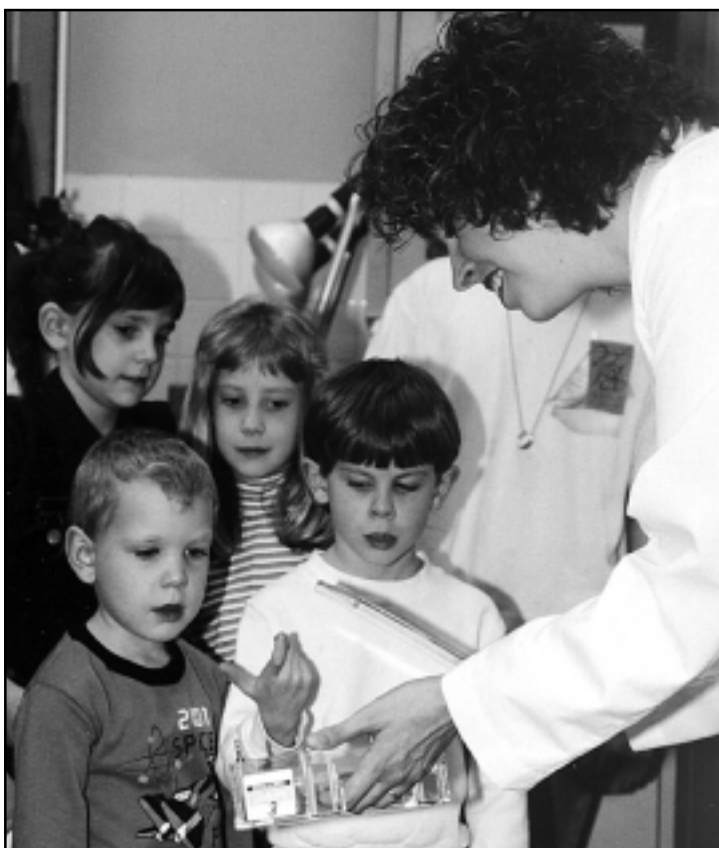
Aviation Medicine Reaches Out to School Children

As part of the Office of Aviation Medicine's community outreach program, volunteers visit area schools to tell students about careers in aviation and aviation medicine, helping to stimulate the interest of youngsters in mathematics and science education through the fascination they have with aviation and space topics.

Dr. Melchor Antuñano describes space flight to these elementary school students.



Roxanne Ritter helps these "home school" children unravel some of the mysteries of the world of science during a tour of the CAMI Toxicology Lab.



LANDING from page 1

was routine flying activity as he switched the fuel selector to the auxiliary tank and set up the navigation system for his destination.

After that, it was anything but routine. "Then, I lost about an hour and a half of my life." The plane, trimmed for cruise flight and on autopilot, flew a perfectly straight course over Kansas until it ran out of fuel and glided to a landing near Cairo, Mo. When he awoke, confused, disoriented, and groggy from a deep sleep, he thought he was still in the air and



CLOSE CALL.

Dr. Frayser's plane glided to a 'safe' landing on a Missouri farm after running out of fuel.

went through landing preparations. As he became more oriented to his surroundings, he realized that he was now on the ground, in a hayfield. The engine was silent. The airplane's right wing was nearly torn off from an impact with a small tree, but the plane was otherwise intact. Aside from some minor cuts and bruises, he seemed to be relatively uninjured. Frayser says he had no memory of landing.

Frayser stated that there were no early warnings or symptoms to alert him. "I just went to sleep." Since the engine had stopped, no one heard the

aircraft as it landed on the open field. "I was alone, disoriented, injured, and had a severe headache and ringing in my ears," he said.

Extracting himself from the aircraft, he struggled a quarter of a mile through snow-covered fields for help, finally finding a farmhouse. Still dazed, he says, "I tried to explain to the farmer what had happened," adding, "he probably thought I was crazy." Fortunately, the farmer called for help. Frayser was taken by ambulance to a local hospital, where the emergency room physician put him on 100 percent oxygen. He had a few cuts and bruises, sore ribs, and a fractured left wrist.

What had caused him to fall asleep? It wasn't an "alien encounter" or a mystery. It was carbon monoxide poisoning from a cracked manifold that had allowed the deadly, odorless gas to seep into the cabin through the heater. The crack, which had apparently opened after the last annual inspection, was concealed by the heat shield and could not be detected during the pre-flight inspection. "The crack could have been there for a long time, just waiting for someone to turn on the heater," he said.

Frayser did not have a carbon monoxide detector aboard to alert him.

NEW AIRPLANE.
Frayser (middle) with replacement Comanche 440 and Matt Greel (l.) and Don Brooks of Century Flight Systems. New aircraft does have a CO detector.



Was it luck that he survived? Of course, luck had a lot to do with it. Just a few feet shorter and his "runway" would have been a plowed field. Had his glide angle been a little lower, he would have hit power lines. A slight wind gust could have changed the outcome dramatically. Another 30 minutes in the air and he probably would have succumbed to carbon monoxide poisoning.

However, two things he did correctly probably saved his life. First, he had good equipment that kept the plane stable until it landed. Second, Frayser says he had quit smoking six months earlier; that factor gave him a probable life-saving margin of an additional 8 percent on his oxygen-hemoglobin dissociation curve. His carboxyhemoglobin level was estimated at 44 percent when he exited the plane (50 percent is usually considered lethal), and it was still at 36 percent when he arrived at the hospital.

The Piper Comanche, which Frayser says was "very special" to him, was removed from the field on a flat-bed truck and taken to an aircraft salvage yard. After the accident, 20 aircraft from the same airfield were inspected and three were found to have cracked manifolds—and only two had CO detectors.

Frayser says he now has a new Comanche 400, identical to the old one, "except it is blue instead of red—and, I now fly with a good carbon monoxide detector in the cockpit."



Douglas Burnett is CAMI's Aviation Medical Examiner Program team manger.

Just for the Health of Pilots

Physical Fitness:

Just About All You'll Ever Need to Know

by Glenn R. Stoutt, Jr., MD
Senior FAA Aviation Medical Examiner

A SURVEY OF THE ARMED forces during World War II showed that Army Air Corps pilots ranked dead last in physical fitness. Things may be some better now, but certainly not with our country as a whole.

Just look at the lean people in the newsreels and movies of the '40s, and compare them with the porked-out people you see on the street today. We are twice as fat; in fact, the fattest people on earth.

It's all caused by eating more and being less active. Sixty-five percent of us get too little exercise, 25 percent none at all. Diet has been covered before (in previous issues), now the bottom line on what all the experts recommend for exercise, with special emphasis this time on weight- or resistance-training.

The prescription for aerobic exercise (walking, cycling, jogging, rowing, swimming, etc.) is pretty simple—an absolute minimum of 20 minutes three times a week. Better still, 30-45 minutes three or four times a week. Best of all, 45 minutes most days of the week. How strenuous? Just enough to sweat a little, breathe a little faster, and increase our heart rate some. Forget the myth of “no pain, no gain.” Why hurt yourself?

Most exercise articles neglect stressing that there is no way to attain fitness without including weight training (barbells and dumbbells) and resistance training (such as weight machines).



Which one is better? Either one or both.

Strength training advantages: increases lean muscle mass; reduces fat; strengthens joints, tendons, and ligaments; reduces stress, anxiety, and depression; lowers your risk of cardiovascular disease; helps prevent adult-onset diabetes; decreases colon cancer; helps prevent osteoporosis (bone loss); improves sleeping; helps you think more clearly. (This almost sounds like a commercial for a rip-off product, too good to be true.) All exercise helps release

endorphins, the chemicals that help us relax, that cause the “runners’ high.”

The great news: Now the experts say that only 10-15 minutes training twice a week is plenty. Even better news is that one set of repetitions of an exercise (about 10 times) is as good as two, three, or even four sets of “reps.” This was reported in *The Physician and Sports-medicine* (Feb. 1997).

How to get started? I highly recommend getting in touch with an exercise physiologist for a few sessions before buying any equipment or joining a health club. After all, if you wanted to take up golf, lessons from a pro would be absolutely necessary. This may be the best money you ever spend on your health. Good habits are as hard to break as bad ones. Learning the correct way to lift weights and to

use exercise machines is a must. Many people working out in gyms are actually hurting their bodies (especially their backs) by using incorrect form. Very few people even know the proper way to do sit-ups (crunches).

The strength training discussed here is for the average person, certainly not one training for sports competition or for the bodybuilder or power lifter.

Go to a gym or health club that has someone specially trained in exercise physiology, not just a person who has been hired off the street who can demonstrate the equipment and

Note: The views and recommendations made in this article are those of the author and not necessarily those of the Federal Aviation Administration.

Continued...

amenities of the club and possibly pressure you into signing up for an expensive membership.

Get a complete tour before you sign up. Talk to other members. The machines available probably will include stationary bikes, treadmills, rowing machines, stair-climbers, cross-country ski apparatus, and so on. There will also be an assortment of weight machines and plenty of free weights.

Try them all to see what you like and will likely stick with, especially before you invest in expensive equipment. The treadmill is probably the favorite. A good one is motorized, has at least a 48-inch track, and will cost about \$1000 if you get a good one. The want ads are replete with bargain buys from exercise dropouts. Avoid all the extras, the bells-and-whistles such as timers, automated routines, calorie-counters, and more information than you need or want.

An example of how to begin training with a pair of dumbbells (not your two partners): Determine how much you can lift—or curl—just one time. Then take 60 percent of this as your beginning weight. Then try to attain ten repetitions with this weight, going slowly from workout to workout. So, if you can lift 25 pounds once, begin with 15 pounds (60 percent of 25 pounds). When you attain ten reps (to fatigue, not exhaustion) with the 15 pounds, then try using 80 percent (20 pounds) of the amount you could lift one time. When your goal is reached, increase weights gradually to the point of fatigue at the end of each set of 10. Contraction and release should be slow, about two or three seconds each. “Progressive overload” is the secret of building lean muscle mass and strength. Just don’t overdo it.

Yours for good health and safe flying,

Glenn Stoutt

Some “pearls” of strength training (and exercise routines in general)

- ✓ Many authorities advise against stretching cold muscles and suggest walking or jogging a few minutes to get the entire circulation going and body heat up and then gently doing a few limbering-up, range-of-motion exercises.
- ✓ There is a great difference in working out and hanging out in the gym. The guy who says he works out about 2½ hours a day may actually be hanging out much of the time, spending lots of time at the water cooler, looking at attractive females, or watching himself in the mirror. Remember, you can get a good resistance workout in 10-15 minutes of actually using weights or machines—just two days a week.
- ✓ Do not hold your breath when using resistance. This creates a Valsalva maneuver, which can raise your blood pressure. Breathe out when exerting. Remember: EX-ert; EX-hale.
- ✓ Select 8-10 exercises of 10 repetitions each that you enjoy and find helpful for each session.
- ✓ Cool down after strength training exercises with a few minutes of walking or jogging and some range-of-motion exercises.
- ✓ Allow 48 hours between resistance-exercise sessions for your muscles to rest, “recharge,” and increase in size and strength.
- ✓ If you are a little sore the next day, no problem. If you hurt so much that you have trouble getting out of bed, you have way overdone it. Rest a day or so, and start over with a less strenuous regimen. “More is not more.”
- ✓ You need exercise the most when you are “too tired” to exercise. Much fatigue is actually caused by muscle tension from the stress you have had that day. Exercise causes the muscles to relax—you too.
- ✓ A flight of stairs is about 12 steps. Twenty flights are equal to about a mile, or 100 calories. No need to buy a stair-climbing machine. Stairs are just about everywhere.
- ✓ A 30-minute workout may sound formidable. You can get just as much benefit by breaking it up into three ten-minute sessions.
- ✓ Disadvantages of health clubs: Time traveling to and from, dressing and undressing, and showering can all add up to about 30-40 wasted minutes. You continue to sweat for 30 minutes after you stop exerting, so you are still sweating when you dress to go home. Also, memberships cost about 50-100 bucks a month. Most of us are more likely to continue with exercise programs at home.
- ✓ Try office push-ups—ten or twenty push-ups from your desk at about a 45-degree angle.
- ✓ Avoid boredom by choosing an exercise that you can safely do while watching TV or listening to tapes.
- ✓ Women do not “bulk up” with resistance training.
- ✓ The secret of success is consistency, motivation, and self-discipline. Exercise is as necessary in your daily life as food, rest, and good friends.



Dr. Stoutt is a partner in the Springs Pediatrics and Aviation Medicine Clinic, Louisville, Ky., and he has been an active AME since 1960. No longer an active pilot, he once held a commercial pilot's license with instrument, multiengine, and CFI ratings.

Federal Air Surgeon's Medical Bulletin 1998 Index of Stories

A handy reference guide to articles that were published in last year's *Bulletin*

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